

Geophysical Monograph 70

Synthesis of Results from Scientific Drilling in the Indian Ocean

Robert A. Duncan
David K. Rea
Robert B. Kidd
Ulrich von Rad
Jeffrey K. Weissel
Editors



American Geophysical Union

CONTENTS

INTRODUCTION

Preface

R. A. Duncan, D. K. Rea, R. B. Kidd, U. von Rad, and J. K. Weissel xi

Acknowledgments xvi

OCEANIC LITHOSPHERE

1. The Plutonic Foundation of a Slow-Spreading Ridge

H. J. B. Dick, P. T. Robinson, and P. S. Meyer 1

2. Physical Properties and Logging of the Lower Oceanic Crust: Hole 735B

R. von Herzen, D. Goldberg, and M. Manghnani 41

3. The Influence of Mantle Plumes in the Generation of Indian Ocean Crust

D. Weis, W. M. White, F. A. Frey, R. A. Duncan, M. R. Fisk, J. Dehn, J. Ludden, A. Saunders, and M. Storey 57

4. The Life Cycle of Indian Ocean Hotspots

R. A. Duncan and M. Storey 91

5. Explosive Ocean Island Volcanism and Seamount Evolution in the Central Indian Ocean (Kerguelen Plateau)

P. R. Bitschene, J. Dehn, K. W. Mehl, and H.-U. Schmincke 105

6. Emplacement and Subsidence of Indian Ocean Plateaus and Submarine Ridges

M. F. Coffin 115

7. Extensional and Compressional Deformation of the Lithosphere in the Light of ODP Drilling in the Indian Ocean

J. K. Weissel, V. A. Childers, and G. D. Karner 127

TETHYS OCEAN MARGINS -

8. Mesozoic Paleoenvironment of the Rifted Margin off NW Australia (ODP Legs 122/123)

U. von Rad, N. F. Exon, R. Boyd, and B. U. Haq 157

9. Tectonics and Sea-Level Changes Recorded in Late Triassic Sequences at Rifted Margins of Eastern and Western Tethys (Northwest Australia, Leg 122; Western Europe)

T. Dumont and U. Röhl 185

10. Sedimentary History of the Tethyan Margins of Eastern Gondwana During the Mesozoic

J. G. Ogg, F. M. Gradstein, J. A. Dumoulin, M. Sarti, and P. Bown 203

INDIAN OCEAN HISTORY

11. Middle and Late Cretaceous History of the Indian Ocean

M. A. Holmes and D. K. Watkins 225

12. Aptian-Albian Calcareous Nannofossil Biostratigraphy of ODP Site 763 and the Correlation Between High- and Low Latitude Zonations

T. J. Bralower 245

CONTENTS

13. Mid-Cretaceous Events in the Indian Ocean - a Key to Understanding the Global Picture
J. Thurn, H. J. Brumsack, R. Littke, P. Meyers, and J. Rullkötter 253
14. The Cretaceous/Tertiary Boundary in the Southern Indian Ocean: Results from the Coring Operations of the Ocean Drilling Program
J. J. Pospichal and B. T. Huber 275
15. Accumulations of Organic Matter in Sediments of the Indian Ocean: A Synthesis of Results from Scientific Deep Sea Drilling
P. A. Meyers and G. R. Dickens 295
16. Cenozoic Carbonate Accumulation and Compensation Depth Changes in the Indian Ocean
L. C. Peterson, D. W. Murray, W. U. Ehrmann, and P. Hempel 311
17. Biosiliceous Sedimentation Patterns for the Indian Ocean During the last 45 Million Years
J. G. Baldauf, J. A. Barron, W. U. Ehrmann, P. Hempel, and D. Murray 335
18. Paleogene and Early Neogene Deep Water Paleoceanography of the Indian Ocean as Determined from Benthic Foraminifer Stable Carbon and Oxygen Isotope Records
J. C. Zachos, D. K. Rea, K. Seto, R. Nomura, and N. Niitsuma 351
19. Delivery of Himalayan Sediment to the Northern Indian Ocean and its Relation to Global Climate, Sea Level, Uplift and Seawater Strontium
D. K. Rea 387
20. An Indian Ocean Framework for Paleoceanographic Synthesis Based on DSDP and ODP Results
R. B. Kidd, J. G. Baldauf, T. A. Davies, D. G. Jenkins, A. T. S. Ramsay, T. J. S. Sykes and S. W. Wise, Jr. 403
21. History of Antarctic Glaciation: An Indian Ocean Perspective
W. U. Ehrmann, M. J. Hambrey, J. G. Baldauf, J. Barron, B. Larsen, A. Mackensen, S. W. Wise, Jr., and J.C. Zachos 423
22. Evolution and Variability of the Indian Ocean Summer Monsoon: Evidence from the Western Arabian Sea Drilling Program
W. L. Prell, D.W. Murray, S. C. Clemens, and D. M. Anderson 447

APPENDIX

1. Indian Ocean Plate Tectonic Reconstructions Since the Late Jurassic
J. Y. Royer, J. G. Sclater, R. L. Fisher, S. Cande, R. Schlich, M. Munschy, J. Dymant, and M. F. Coffin 471